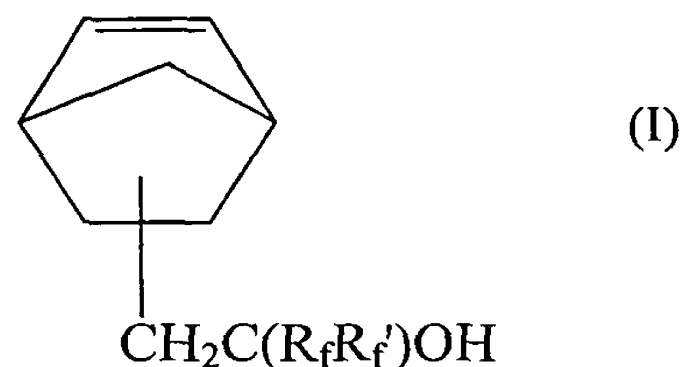


CLAIMS

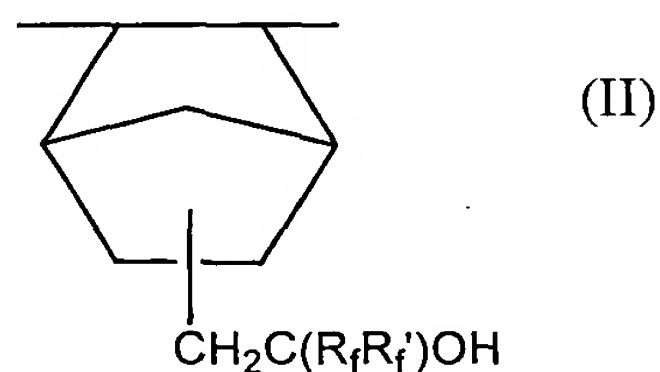
What is claimed is:

1. A composition comprising endo- and exo- 2-(bicyclo[2.2.1]hept-5-en-2-yl)- 2,2-fluoroalkyl-ethan-2-ol whereof the endo/exo concentration  
 5 ratio is no greater than 5/95, as represented by the structure (I)



wherein the  $\text{R}_f$  and  $\text{R}_f$  groups are the same or different fluoroalkyl groups of from 1 to about 10 carbon atoms, or taken together in cyclic form are  
 10  $(\text{CF}_2)_n$  where n is an integer from 2 to 10.

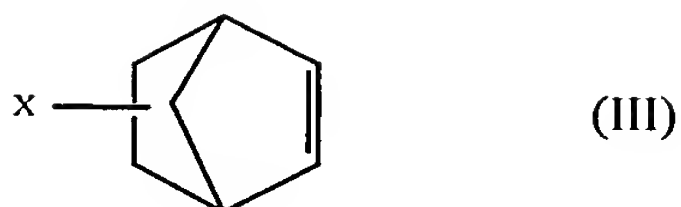
2. The composition of Claim 1 wherein the  $\text{R}_f$  and  $\text{R}_f$  groups are perfluoromethyl.
3. A polymer made by polymerizing the composition of Claim 1.
4. A copolymer made by copolymerizing the composition of  
 15 Claim 1 and an olefinic comonomer.
5. The copolymer of Claim 4 in which the olefinic comonomer is a fluorolefin.
6. A polymer comprising about 10 mol % to about 60 mole % of a repeat unit derived from a composition comprising endo and exo monomer  
 20 units represented by structure (II)



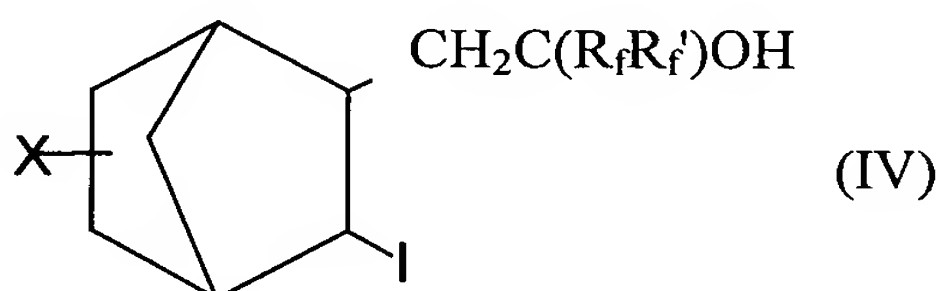
wherein the  $\text{R}_f$  and  $\text{R}_f$  groups are the same or different fluoroalkyl groups of from 1 to 10 carbon atoms, or taken together in cyclic form are  $(\text{CF}_2)_n$ ; n is an integer from 2 to 10; the monomer units of the composition having an endo/exo ratio no greater than 5/95.

7. The polymer of Claim 6 further comprising a unit derived from an olefinic monomer.



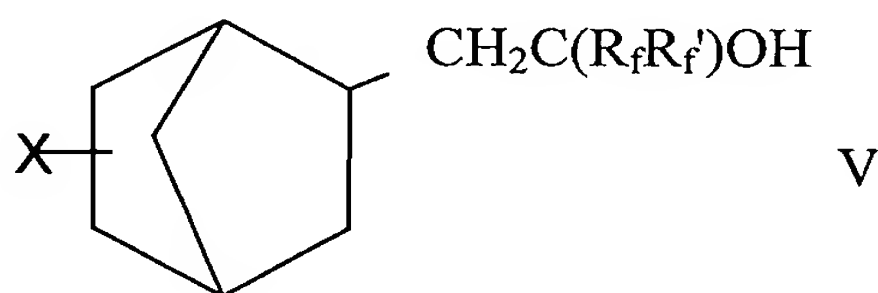


to form an iodine-containing substituted norbornane compound represented by structure (IV);

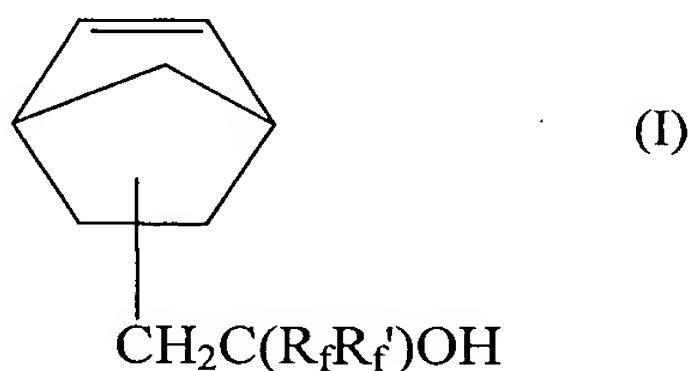


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contacting said iodine-containing compound with a reducing agent to form a substituted norbornane represented by structure (V);



- 10 forming an olefin from the substituted norbornane (V) to form a composition comprising endo and exo 2-(bicyclo[2.2.1]hept-5-en-2-yl)- 2,2-perfluoroalkyl-ethan-2-ol, whereof the endo/exo concentration ratio is no greater than 5/95 as represented by the structure (I).



15

wherein in the foregoing structures the  $R_f$  and  $R_{f'}$  groups are the same or different fluoroalkyl groups of from 1 to 10 carbon atoms, or taken together in cyclic form are  $(CF_2)_n$ ,  $n$  is an integer from 2 to 10, and wherein  $X$  is selected from the group consisting of  $Cl$ ,  $Br$ , and  $R_8SO_2-O-$ , where  $R_8$  is an alkyl-, fluoroalkyl, aryl or fluoroaryl radical.

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17. The process of Claim 16 wherein at least one of  $R_f$  and  $R_{f'}$  is perfluoromethyl.

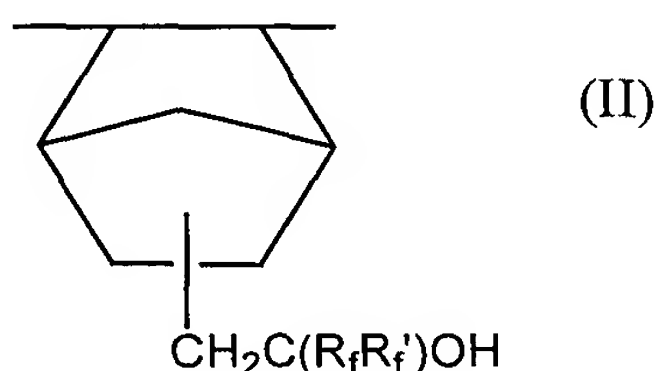
18. The process of Claim 16 wherein X is Cl.

19. The process of Claim 16 wherein the Cl is predominantly in the  
5   exo position.

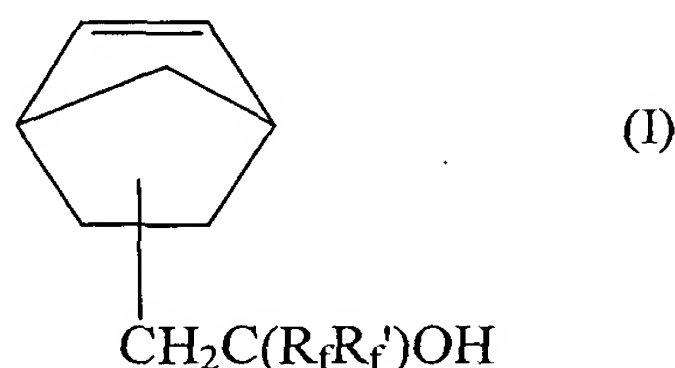
20. The process of Claim 16 wherein said iodine-containing compound is contacted with a reducing agent.

21. The process of Claim 16 wherein said solvent is selected from the group consisting of water, alcohol, tetrahydrofuran and a glyme; said  
10   hydrogenation catalyst is Pd or Pt, and the base is selected from the group consisting of sodium and potassium bicarbonate, sodium and potassium carbonate, and an amine.

22. A photoresist suitable for use in the preparation of electronic  
15   circuits said photoresist comprising a photoactive agent and a polymer comprising 10 mol-% to 60 mol-% of a repeat unit represented by the structure (II)



20   and whereof said repeat unit is derived from a composition comprising endo- and exo- 2-(bicyclo[2.2.1]hept-5-en-2-yl)- 2,2-fluoroalkyl-ethan-2-ol, as represented by the structure (I)



25   wherein the  $R_f$  and  $R_{f'}$  groups are the same or different fluoroalkyl groups of from 1 to about 10 carbon atoms, or taken together in cyclic form are  $(\text{CF}_2)_n$  where n is an integer from 2 to 10, whereof the endo/exo ratio is no greater than 5/95.

23. The photoresist of Claim 22 wherein at least one of  $R_f$  and  $R_{f'}$  is perfluoromethyl.

24. The photoresist of Claim 22 wherein said polymer further comprises a unit derived from a fluoroolefin selected from the group consisting of tetrafluoroethylene, hexafluoropropylene, chlorotrifluoroethylene, vinylidene fluoride, vinyl fluoride, perfluoro-(2,2-dimethyl-1,3-dioxole), perfluoro-(2-methylene-4-methyl-1,3-dioxolane),  $CF_2=CFO(CF_2)_tCF=CF_2$ , where  $t$  is 1 or 2, and  $R_{f'}=OCF=CF_2$  wherein  $R_{f'}$  is a fluoroalkyl group of from 1 to 10 carbon atoms.

25. The photoresist of Claim 24 wherein said fluoroolefin is tetrafluoroethylene.

26. The photoresist of Claim 22 wherein said polymer further comprises a unit having a protected acidic group.

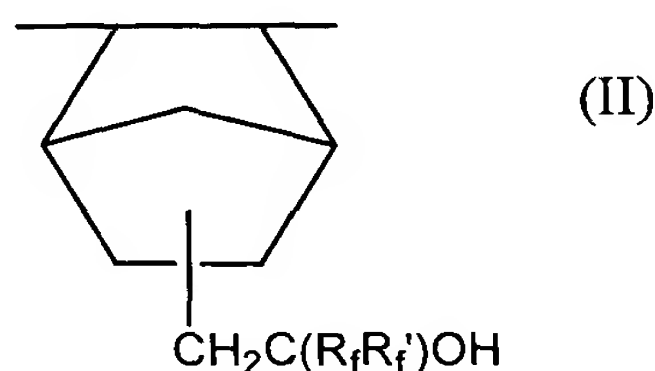
27. The photoresist of Claim 26 wherein said acidic group is a fluorinated alcohol group.

28. The photoresist of Claim 26 wherein said protected acidic group is selected from the group consisting of esters capable of forming, or rearranging to, a tertiary cation, esters of lactone, acetal esters,  $\beta$ -cyclic ketone esters,  $\alpha$ -cyclic ether esters, methoxy ethoxy ethyl methacrylate, and carbonates formed from a fluorinated alcohol and a tertiary aliphatic alcohol.

29. The photoresist of Claim 22 wherein said polymer further comprises a unit derived from one or more of tert-butyl acrylate, 2-methyl-2-adamantyl acrylate, 2-tetrahydropyranyl acrylate, 2-tetrahydrofuramyl acrylate, and 2-hydroxy-1,1,2-trimethylpropyl ester.

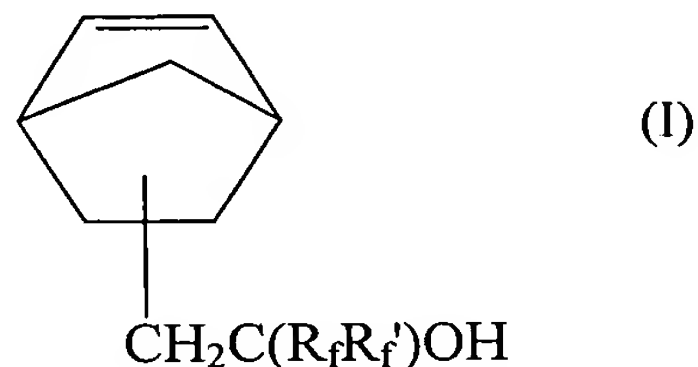
30. The photoresist of Claim 22 wherein said unit is derived from t-butyl acrylate or 2-methyl-2-adamantyl acrylate.

31. An article comprising a semiconducting substrate having a surface, and a photoresist film disposed upon at least a portion of said surface, said photoresist film comprising a photoactive agent and a polymer comprising 10 mol-% to 60 mol-% of a repeat unit represented by the structure (II)



and whereof said repeat unit is derived from a composition comprising endo- and exo- 2-(bicyclo[2.2.1]hept-5-en-2-yl)- 2,2-fluoroalkyl-ethan-2-ol, as represented by the structure (I)

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wherein the  $\text{R}_f$  and  $\text{R}_f$  groups are the same or different fluoroalkyl groups of from 1 to about 10 carbon atoms, or taken together in cyclic form are  $(\text{CF}_2)_n$  where  $n$  is an integer from 2 to 10, whereof the endo/exo ratio is no greater than 5/95.

10 32. The article of Claim 31 wherein at least one of  $\text{R}_f$  and  $\text{R}_f$  is perfluoromethyl.

33. The article of Claim 31 wherein said polymer further comprises repeat units derived from a fluoroolefin selected from the group consisting of tetrafluoroethylene, hexafluoropropylene, chlorotrifluoroethylene, vinylidene fluoride, vinyl fluoride, perfluoro-(2,2-dimethyl-1,3-dioxole), perfluoro-(2-methylene-4-methyl-1,3-dioxolane),  $\text{CF}_2=\text{CFO}(\text{CF}_2)_t\text{CF}=\text{CF}_2$ , where  $t$  is 1 or 2, and  $\text{R}_f''\text{OCF}=\text{CF}_2$  wherein  $\text{R}_f''$  is a fluoroalkyl group of from 1 to 10 carbon atoms.

20 34. The article of Claim 33 wherein said fluoroolefin is tetrafluoroethylene.

35. The article of Claim 31 wherein said polymer further comprises a repeat unit derived from a monomer having a protected acidic group.

25 36. The article of Claim 35 wherein said acidic group is a fluorinated alcohol group.

37. The article of Claim 35 wherein said protected acidic group is selected from the group consisting of esters capable of forming, or rearranging to, a tertiary cation, esters of lactone, acetal esters,  $\beta$ -cyclic ketone esters,  $\alpha$ -cyclic ether esters, methoxy ethoxy ethyl methacrylate, and carbonates formed from a fluorinated alcohol and a tertiary aliphatic alcohol.

30 38. The article of Claim 31 further comprising a unit derived from a monomer selected from the group consisting of tert-butyl acrylate, 2-

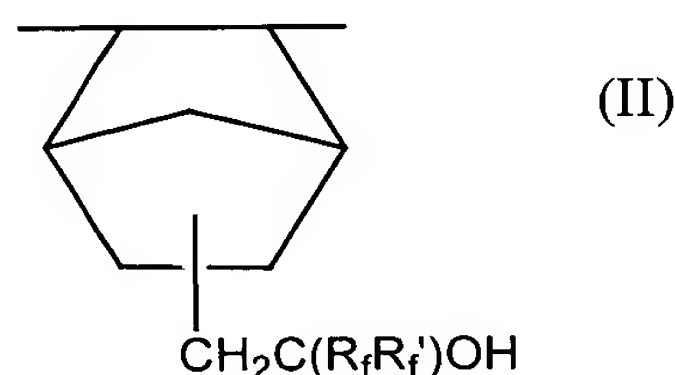
methyl-2-adamantyl acrylate, 2-tetrahydropyranyl acrylate, 2-tetrahydrofuramyl acrylate, and 2-hydroxy-1,1,2-trimethylpropyl ester.

39. The article of Claim 38 wherein said monomer is t-butyl acrylate or 2-methyl-2-adamantyl acrylate.

5 40. The article of Claim 31 wherein said substrate comprises silicon.

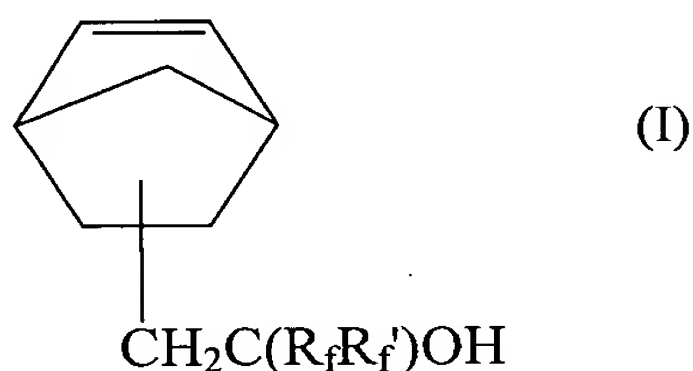
41. A process for preparing a patterned article the process comprising:

10 forming a target surface by disposing upon a semiconducting substrate a photoresist film comprising a photoactive agent and a polymer comprising 10 mol-% to 60 mol-% of a repeat unit represented by the structure (II)



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whereof said repeat unit is derived from a composition comprising endo- and exo- 2-(bicyclo[2.2.1]hept-5-en-2-yl)- 2,2-fluoroalkyl-ethan-2-ol, as represented by the structure (I)



20

wherein the  $\text{R}_f$  and  $\text{R}_f'$  groups are the same or different fluoroalkyl groups of from 1 to about 10 carbon atoms, or taken together in cyclic form are  $(\text{CF}_2)_n$  where  $n$  is an integer from 2 to 10, whereof the endo/exo ratio is no greater than 5/95;

25

illuminating said target surface in such a manner as to form a pattern of shadowed and illuminated areas, the illuminating step causing a change in solubility of said polymer;

removing the soluble portions of said polymer, thereby producing a patterned article.

42. The process of Claim 41 in which the process further comprises after the illuminating step a step of heating the target surface.

43. The process of Claim 41 wherein at least one of  $R_f$  and  $R_f'$  is perfluoromethyl.

5        44. The process of Claim 41 wherein said polymer further comprises a unit derived from a fluoroolefin selected from the group consisting of tetrafluoroethylene, hexafluoropropylene, chlorotrifluoroethylene, vinylidene fluoride, vinyl fluoride, perfluoro-(2,2-dimethyl-1,3-dioxole), perfluoro-(2-methylene-4-methyl-1,3-dioxolane),  
10         $CF_2=CFO(CF_2)_tCF=CF_2$ , where  $t$  is 1 or 2, and  $R_f''OCF=CF_2$  wherein  $R_f''$  is a fluoroalkyl group of from 1 to 10 carbon atoms.

45. The process of Claim 44 wherein said fluoroolefin is tetrafluoroethylene.

15        46. The process of Claim 41 wherein said polymer further comprises a unit having a protected acidic group that forms, when photolytically activated, hydrophilic acidic groups which enable development of resist coatings.

47. The process of Claim 46 wherein said acidic group is a fluorinated alcohol group.

20        48. The process of Claim 46 wherein said protected acidic group is selected from the group consisting of an ester capable of forming, or rearranging to, a tertiary cation, an ester of lactone, an acetal ester, a  $\beta$ -cyclic ketone ester, an  $\alpha$ -cyclic ether ester, a methoxy ethoxy ethyl methacrylate, and a carbonate formed from a fluorinated alcohol and a  
25        tertiary aliphatic alcohol.

49. The process of Claim 41 wherein said polymer further comprises a unit derived from a monomer selected from the group consisting of tert-butyl acrylate, 2-methyl-2-adamantyl acrylate, 2-tetrahydropyranyl acrylate, 2-tetrahydrofuranyl acrylate, and 2-hydroxy-  
30        1,1,2-trimethylpropyl ester.

50. The process of Claim 49 wherein said monomer is t-butyl acrylate or 2-methyl-2-adamantyl acrylate.

51. The process of Claim 41 wherein said substrate comprises silicon.

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